

**What is Claimed is:**

1. A fiber comprising poly(ethylene oxide) that is water-soluble and melt processable.

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2. The fiber of Claim 1, wherein the fiber diameter has an average diameter of not greater than about 100 micrometers.

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3. The fiber of Claim 1, wherein the poly(ethylene oxide) has sufficient melt strength and sufficient melt elasticity for melt spinning into fibers.

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4. The fiber of Claim 3, wherein the poly(ethylene oxide) has an apparent viscosity of less than 200 Pascal\*seconds at shear rates of not less than 100 second<sup>-1</sup> and not greater than 1,000 second<sup>-1</sup>.

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5. The fiber of Claim 1, wherein the poly(ethylene oxide) has a molecular weight within the range of about 50,000 g/mol to about 400,000 g/mol.

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6. The fiber of Claim 3, wherein the fiber consists essentially of poly(ethylene oxide).

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7. A fiber comprising a modified poly(ethylene oxide).

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8. The fiber of Claim 7, wherein the modified poly(ethylene oxide) is modified from a poly(ethylene oxide) having an initial molecular weight before modification within the range of about 50,000 g/mol to about 400,000 g/mol.

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9. The fiber of Claim 8, wherein the modified poly(ethylene oxide) is modified from a poly(ethylene oxide) having an initial molecular weight before modification within the range of about 50,000 g/mol to about 200,000 g/mol.

10. The fiber of Claim 7, wherein the modified poly(ethylene oxide) is modified by the addition of an initiator.

11. The fiber of Claim 7, wherein the modified poly(ethylene oxide) is modified by the addition of a monomer and an initiator.

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12. The fiber of Claim 11, wherein the monomer is a polar vinyl monomer.

10 13. The fiber of Claim 12, wherein the polar vinyl monomer is selected from the group consisting of poly(ethylene glycol) methacrylates and 2-hydroxyethyl methacrylate.

15 14. The fiber of Claim 13, wherein the polar vinyl monomer is a poly(ethylene glycol) ethyl ether methacrylate and has an average molecular weight of not greater than about 5,000 grams per mol.

20 15. The fiber of Claim 11, wherein the monomer is added within the range of about 0.1 to about 20 weight percent relative to the weight of the poly(ethylene oxide).

25 16. The fiber of Claim 7, wherein the modified poly(ethylene oxide) is a grafted poly(ethylene oxide).

30 17. A method for processing poly(ethylene oxide) fibers comprising the steps of:

a) adding a poly(ethylene oxide), a monomer, and an initiator into a reaction vessel;

b) mixing the poly(ethylene oxide), the monomer and the initiator under conditions sufficient to graft the polar vinyl monomer onto the poly(ethylene oxide); and

c) drawing fibers from the poly(ethylene oxide).

35 18. The method of Claim 17, wherein the monomer is a polar vinyl monomer.

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19. The method of Claim 17, wherein the polar vinyl monomer is selected from the group consisting of poly(ethylene glycol) methacrylates and 2-hydroxyethyl methacrylate.

20. A fiber produced by the method of Claim 17.

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